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advantage of this and increased their price beyond what was fair and reasonable, and now the French government has met them with a decree, authorizing the State to acquire by *expropriation* the land on which these monuments are situated, principally in the Commune of Carnac, Department of Morlehan.

Many of the monuments have already been acquired; have been restored to their original condition, surrounded by a fence, where practicable, for the necessary preservation. This has been done under the supervision of M. Felix Gaillard, archæologist of Plouharnel.

Those to be added under the decree, above mentioned, will be the great alignments of Menec, of Kermario and of Kerlescan; the great tumulus of Saint-Michel, that of Moustier, of Crucuny and of Kerlescan. Also six Menhirs and six Dolmens.

It is believed that under the operation of this law the present proprietors will yield, and that the State will acquire, by purchase, all the monuments of this kind within the commune. When these are restored and put in proper condition, this commune will be one of the most attractive in all France, and the American tourist, interested in prehistoric archæology, will feel it as much a necessity to visit it as to visit Paris.—*T. W.*

RECENT LITERATURE.

A Review of Mr. Lydekker's Arrangement of the Mesozoic Mammalia (Cat. Foss. Mamm., British Museum, Part V., 1887).—Mr. Lydekker places all the Mesozoic mammalia among the Marsupialia, not admitting that there is sufficient weight in the close analogy between the dentition of the Stylodontidæ and Chrysochloridæ to support a reference of this family to the Insectivora. The genera included under the sub-order Multituberculata of Cope are provisionally embraced in the Diprotodontia (p. 195,) while all the remaining forms with numerous small incisors are placed with the Polyprotodontia. I agree with the author that the systematic position of the Multituberculata forms, such as Plagiaulax, Tritylodon and Polymastodon must be left, in a measure, provisional until additional material is obtained; but at present, in my opinion, the balance of evidence necessitates their separation from the Diprotodonts. The most striking feature of both these groups is the hypertrophy of a pair of incisors in each jaw; but, so far as a close comparison of these incisors in the fossil and recent forms is possible, it supports the conjecture that these teeth in the two groups *are neither homologous nor homodynamous*, although bearing a superficial analogy.[1]

(1.) As regards homology, in all the Quaternary and recent Diprodonts it is the median incisor which is hypertrophied; whereas, in the Mesozoic genera—in which the mode of reduction has been observed—the second incisor, or, rather, one of the lateral incisors is hypertrophied. In the Bolodontidæ, as demonstrated by Marsh in his observations upon *Allodon*, the median incisor is reduced and the *second* incisor is hypertrophied. In *Tritylodont* there are two incisors: the outermost is close to the maxillary suture; the hypertrophied incisor is close in front of this and widely separate from its opposite fellow, indicating that if this genus is descended from a form with three or four incisors (as a comparison with Bolodon renders probable), it is again the median incisor which has disappeared. We have no further evidence bearing upon this point, so it will be of importance to observe which of the incisors is hypertrophied in *Plagiaulax.*[2]

(2.) *As regards homodynamy*, another characteristic which appears to be universal among the Multiberculates is the fore-and-aft grinding motion between the alternating rows of tubercles upon the upper and lower molars. This is very marked in *Bolodon* and *Tritylodon;* it is in a transition stage from a fore-and-aft to a circular grinding motion in *Polymastodon;* it is very evident in the later Plagiaulacidæ. Professor Marsh recently called my attention to the wearing of the posterior face of the large upper incisor of *Allodon* by the tip of the lower tooth. This interference forces the jaw backwards as it ascends by a mechanism similar to that in the rodents, as demonstrated by Cope.[3] It has effected a rapid reduction of the other incisors, as witnessed in *Tritylodon* and *Bolodon;* a total reduction, as witnessed in *Polymastodon* and *Plagiaulax.* In contrast with these genera, the recent Diprotodonts present, for the most part, three upper incisors; while the reduction of all, except the median incisors and the fore-and-aft grinding motion, is confined to a single family, the Phascolomyidæ.

(3.) The longitudinal arrangement of the conical tubercles in two or more rows is peculiar to the Multituberculates, and, according to Cope, forms a sufficiently clear sub-ordinal distinction.[4]

The technical question of taxonomic position is, however, of minor interest. The chief point is the question of phylogeny. In my opinion, the Multituberculata will finally prove entirely distinct from the Diprotodonts and representative of a phylum of genera which reached too great a degree of specialization at the close of the Cretaceous to survive until the recent period. *Thylacoleo* was placed as the latest representative of the Plagiaulax line by Owen, and, later, by Cope; but this view is not shared by Lydekker, who places it near the Phalangistidæ. (Op. cit., p. 188.)

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[1] In the Postscript, p. xv., by a slight oversight, the author refers to *Spalacotherium*, instead of *Stylodon*, as having been compared by Osborn with *Chrysochloris*. (See Osborn, Proc. Phila. Acad, 1887.)

[2] Mr. Lydekker mentions (p. 195, footnote) that Lemoine describes two incisors and a canine in the maxillary series of *Plagiaulax*. I have not come across this description.

[3] The Mechanical Causes of the Origin of the Dentition of the Rodentia. American Naturalist, January, 1888, p. 12.

[4] The Tertiary Marsupialia. American Naturalist, 1884, p. 188.

The family arrangement is the same as that proposed by Cope and adopted by myself,[1] with the addition of the Bolodontidæ. We are surprised to find *Microlestes* placed in the latter family instead of in the Plagiaulacidæ; for the type-molars bear only a superficial resemblance to those of *Bolodon*, and closely approach those of *Plagiaulax*.

The Polyprotodont genera are provisionally placed by Lydekker in five distinct families, under the Marsupialia Polyprotodontia. In the arrangement of these genera the author has been at a great disadvantage in not having been able to study the types of the Yale College collection, in which the molars are exposed upon both the inner and outer surfaces, and thus fails to recognize the distinctive features of the molars in many instances. But this will not explain his separation of *Amphilestes* and *Phascolotherium* from the Triconodon line and their union with such diverse forms as *Amphitherium*, *Achyrodon* and *Peramus*.

(1.) In the Amphitheriidæ (which embraces, among others, the five genera just mentioned) we are surprised to find (p. 274) that *Peraspalax* is made a synonym of *Amblotherium*. This is explained in a footnote (p. 274), in which a small inner cusp is described upon the lower molars of *A. soricinum*—an interesting observation if correct, because it is entirely opposed to the observations of Owen (Mesozoic Mammalia, 1871) and the writer (1886). According to the latter, *Peraspalax* has prominent internal cusps, separate from the internal —a type of molar found only in the type maxilla of *Peralestes*. The lower jaw of *Peralestes*, type of *Phascolestes* (Owen), is also united with *Amblotherium*. This is more probable, as the outer face of neither genus is certainly known, and the inner faces are very similar; but if *Amblotherium* and *Phascolestes* are alike, both must be removed with *Achyrodon* to the Stylodontidæ.

This turns upon the observations of Owen of impressions of styloid external cusps of the *Phascolestes* molars, which is not confirmed by Lydekker (p. 276), although in *Dryolestes vorax*,[2] Marsh, we have a jaw and dentition closely similar to that of this genus, with styloid external molar cusps. *Amblotherium* and *Achyrodon* have a much more delicate dentition than *Phascolestes;* but the writer anticipates that when the outer faces of the lower molars are known they will also prove to be of the *Stylodon* type.[1] The Amphitheriidæ is thus made a miscellaneous family, to embrace genera with lower molars —" multicuspidate, tricuspidate, or differentiated into a blade and talon." "The difference in the character of the lower molars is not greater than obtaining in the Dasyuridæ" (p. 269).

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[1] On the Structure and Classification of the Mesozoic Mammalia. Abstract, Proc. Phila. Acad., June, 1887.

[2] Am. Jour. Sc. and Arts, April, 1887.

While this may be true, it does not afford sufficient ground for separating *Phascolotherium* and *Amphilestes* from genera with three-lobed molars (*Triconodon*) and placing them with genera with two-lobed molars (*Amphitherium* and *Peramus*). The American genus *Dromatherium*, with unpaired fangs, is also placed in this family, adding to its heterogeneous character.

(2.) Triconodontidæ, *Triconodon*, probably by a typographical error, is stated to have no internal cingulum upon its molars (p. 257). The cingulum is one of the most characteristic features of the molars, and establishes the close homology which exists between the *Triconodon*, *Phascolotherium*, *Amphilestes* and *Spalacotherium* molars, indicating their phylogenetic relation with many mandibular and dental characters in common, that they formed a series of primitive Carnivora. Lydekker follows Marsh[6] and Osborn[5] in making *Spalacotherium* the type of a distinct family, the (3) *Spalacotheriidæ*. The inward rotation of the lateral cusps characteristic of this genus is begun in *Phascolotherium* and extended in *Tinodon*, affording transitions; so that, with the resemblances of the mandible and premolars, it is probable that this genus is an offshoot of the *Triconodon* type. At all events, I cannot now discover family characters sufficient to separate it from the Triconodontidæ. I cannot share the opinion (p. 292) that these molars are of the *Chrysochloris* type; they are rather of a primitive tubercular, sectorial order, leading to the sectorial triangle of the *Didelphys* molar. Upon page 294 we find *Peralestes* (type maxilla, Owen) also placed in this family, and doubtfully separated as a genus from *S. tricuspidens*. The molars of this genus, with separate external and internal cusps, are widely different from those of *Spalacotherium*, the upper molars of which will probably be found to exactly reverse the pattern of the lower. This genus seems, therefore, to be identical with Peraspalax.

(4.) It is in *Stylodon*, type of the Stylodontidæ, that we find the real homologue of the *Chrysochloris* molar[5] and a representative of a true line of Insectivora. Lydekker, although in possession of Marsh's description of the lower molars of the closely allied genus *Dryolestes*, describes the lower molars of the Stylodontidæ as simply conical (p. 290). We have positively no grounds for referring this family to the Marsupialia. No Marsupial presents an analogous dentition. *Perameles*, it is true, bears a similar relation to *Tupaia*; but some stress may be laid upon the fact that the *Stylodon* and *Chrysochloris* are the only known examples of this type of molar.

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[1] In fact, it is probable that several specimens which were referred to *Amblotherium* by Owen really belong to *Stylodon—e.g.*, *A. mustelula* (Plate II., Fig. 2, Owen's Memoirs). The mandibular and premolar structure of this genus and *Achyrodon* is very similar to some of the *Trylodontidæ*. See *Achynodon Names*, Owen, Plate II., Fig. 7.

As Mr. Lydekker himself indicates by his frequent use of the word *provisional*, we are certainly not in a position to reach final conclusions in regard to the classification of the greater number of these Mesozoic genera; and this review of the related portion of this valuable catalogue is intended, in large part, to suggest further inquiry, rather than as an expression of final opinion on my own part. —*Henry F. Osborn.*

SEEBOHM ON THE CHARADRIIDÆ.[1]—This is another of the handsomely illustrated works of large folio with which the ornithologists of Britain from time to time delight the scientific world, and all other lovers of nature as well. While the present publication does not pretend to be a complete descriptive monograph, diagnostic characters and figures of species and sub-species are given, which are quite sufficient for the determination of the known members, at least, of the family. The scope of the work is indicated by the fact that it embraces as Charadriidæ the tribe Limicalæ of many authors. Especial attention is given, as the title indicates, to the geographical distribution of the members of the family, with especial reference to their evolution.

The first chapter is occupied with the classification of birds in general. The second is devoted to evolution in general. The author here distinctly affirms the doctrine that Natural Selection never originated anything, and he ranges himself on the side of the Neolamarckian school, although he does not say so in precise terms. In this matter he shows himself to be much more perspicacious than those of his countrymen who, like Mr. Romanes, regard this view of the subject as "transparently fallacious" (Romanes in review of Schurman in *Nature*, Feb., 1888). But we take issue with Mr. Seebohm in his expression of evolution in taxonomy. Like Schlosser, he believes that "natural" groups must represent phylogenetic series, and he believes these series to be expressed by the totality of the animals' characters. Thus characters of the specific grade generally in his system take precedence of those usually regarded as generic and even higher. We have objected to this doctrine on various grounds, especially in our essay on The Origin of Genera.[2] First, because generic characters probably express more in phylogeny than specific; second, because specific characters consist of an aggregate of single characters, and each has had a history independent of the others, so that

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[1] The Geographical Distribution of the Charadriidæ, by Henry Seebohm. London: Henry Sothern & Co. 1887. 4to, pp. 524.

[2] Origin of the Fittest. D. Appleton & Co. 1887. Art. II.